

AMERICAN SOCIETY FOR TESTING MATERIALS BULLETIN

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PHILADELPHIA, PA.

"Promotion of Knowledge of Materials of Engineering and Standardization of Specifications and Methods of Testing"

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Regional Meeting in Philadelphia, March 6

Committees to Meet During Week, March 4 to 8

THE week beginning Monday, March 4, will be an active Society week, for the 1935 Regional Meeting is to be held in Philadelphia at The Warwick hotel on Wednesday, March 6, and a large number of Society committees are scheduling meetings over the five-day period March 4 to 8, when the Spring Group Meetings of Committees will be in progress.

The technical feature of the Regional Meeting is to be a Symposium on Paint and Paint Materials under the sponsorship of A.S.T.M. Committee D-1 on Preservative Coatings. Development of the program is in charge of a special committee headed by R. L. Hallett, Chemist, National Lead Co. Two sessions will be devoted to the symposium—Wednesday morning and afternoon.

The Philadelphia District Committee under the chairmanship of H. M. Hancock, The Atlantic Refining Co., is in charge of local arrangements for the meeting and the following committees have been appointed:

INSPECTION TRIPS
W. H. Fulweiler
J. W. Sidebotham, Jr.

LADIES' ENTERTAINMENT
Harold Farmer
N. L. Mochel
J. C. Geniesse

INVITATION AND PUBLICITY
C. N. Forrest
W. T. Pearce
A. R. Wilson
G. H. Woodroffe

DINNER AND MUSEUM
G. H. Clamer
L. G. Wilson
Alexander Foster, Jr.

An informal dinner has been planned, to follow the afternoon session. There is also planned a visit to the Franklin Institute Museum and the Fels Planetarium. Special transportation will take the members to the building, which is a few minutes ride from The Warwick.

A specially conducted tour of high spots of the Museum will ensue followed by an appropriate lecture in the new planetarium. One of the sections in the Museum is devoted to testing machines—some of the earliest built—and many of the members will be particularly interested in this department.

Comprehensive Symposium Developed

The committee in charge of the symposium has enlisted the aid of many outstanding technologists in the paint and allied industries and in fields where paint is an important material. Each contributor to the symposium has developed a paper to cover his subject from a broad viewpoint to deal adequately with the various technical phases, but to present

the information and data so that it will be of special interest to the consumers of preservative coatings as well as those representing the paint manufacturing industry.

The topic of "paint" is considered a very appropriate one for a meeting in Philadelphia, because of the many firms in this area which are in the industry. Well attended sessions are anticipated. The papers which will be included follow:

SYMPOSIUM ON PAINT AND PAINT MATERIALS

LOOKING INTO THE FUTURE—H. A. Gardner, Chemical Engineer, The Institute of Paint and Varnish Research.

PREPARATION, USE AND ABUSE OF SPECIFICATIONS FOR PAINT MATERIALS—P. H. Walker, Assistant Chief, Chemistry Division, National Bureau of Standards.

PROTECTIVE AND DECORATIVE COATINGS FOR RAILWAY PASSENGER CAR EQUIPMENT—A. M. Johnsen, Engineer of Tests and Chemist, The Pullman Co.

PAINT TESTING—C. D. Holley, Director of Paint Research, The Sherwin-Williams Co.

VARNISH TESTING—W. R. Fuller, Technical Director, Pratt & Lambert, Inc.

LACQUER AND LACQUER TESTING—H. E. Eastlack, Director, Parlin Laboratory, E. I. du Pont de Nemours and Co.

DRYING OILS—S. O. Sorenson, Chemist, Archer-Daniels-Midland Co.

ZINC PIGMENTS—E. H. Bunce, General Manager, Technical Dept., New Jersey Zinc Co.

LEAD PIGMENTS—R. L. Hallett and C. H. Rose, Chemists, National Lead Co.

TITANIUM PIGMENTS—I. D. Hagar, Eastern Sales Manager, Titanium Pigment Co.

MINERAL PIGMENTS—J. W. Ayers, Director of Research, C. K. Williams and Co.

CHEMICAL COLORS—A. F. Brown, General Manager, Imperial Color Works.

NATURAL AND SYNTHETIC RESINS—W. T. Pearce, The Resinous Products and Chemical Co.

LACQUER SOLVENTS AND VOLATILE THINNERS—R. M. Carter, Research Chemist, U. S. Industrial Alcohol Co.

A number of other technologists are being invited to discuss the papers and this will add to the interest in the sessions. The papers will not be printed in advance for distribution, but will be published later in the year.

Group Meetings of Committees

Members of committees appreciate the significance and purpose of Committee Week. It was instituted to conserve the time and expenses of the large number of members who are interested in the work of several different committees. Careful study is made to develop a schedule having a minimum of conflicts and a large number of standing committees participate. A list of those which thus far have decided to hold meetings in Philadelphia follows:



A-1 on Steel
 A-2 on Wrought Iron
 A-4 on Heat-Treatment of Iron and Steel
 A-5 on Corrosion of Iron and Steel
 A-6 on Magnetic Properties
 B-1 on Copper Wire
 Subcommittees of B-2 on Non-Ferrous Metals and Alloys
 B-3 on Corrosion of Non-Ferrous Metals and Alloys
 B-5 on Copper and Copper Alloys
 B-6 on Die-Cast Metals and Alloys
 B-7 on Light Metals and Alloys
 C-3 on Brick
 C-4 on Clay Pipe
 C-10 on Hollow Masonry Building Units
 Subcommittees of D-1 on Preservative Coatings
 D-2 on Petroleum Products and Lubricants
 D-4 on Road and Paving Materials
 D-5 on Coal and Coke
 D-8 on Bituminous Waterproofing and Roofing Materials
 D-11 on Rubber Products
 D-15 on Thermometers
 Subcommittees of E-1 on Methods of Testing
 Subcommittees of E-4 on Metallography
 Coordinating Committee on Non-Ferrous Metals and Alloys
 Research Committee on Fatigue of Metals

This list is by no means final, since returns have not been received from many of the committees who may meet and of course last-minute changes often occur in the plans of some of the committees.

Reduced Railroad Fares

Most of the railroad passenger associations have granted special reduced fares for the group meetings and it is expected these reductions will be in effect for all sections of the country. The reduction will be on the receipt Certificate Plan, at fare and one-third for the round trip, provided the same route is used both going and returning and provided further that 100 certificates are turned in for validation.

Members should purchase the regular one-way ticket to Philadelphia and must secure a **certificate** (not a receipt) from the ticket agent when making the purchase. These certificates will be validated by the railroad representative at the A.S.T.M. registration desk in The Warwick hotel. Members will then be able to purchase the return ticket at one-third fare. These special rates will afford a considerable saving to many of our members and it is accordingly urged that each member secure a certificate whether or not he intends to use it, and to deposit it at the registration desk immediately on his arrival, thus assisting in having the required number of certificates deposited early in the week. Tickets may be purchased several days in advance of March 4 depending on the location, and the return ticket must be purchased before March 12 in most cases. *Check these details with your local agent and be sure to get your certificate when you purchase your ticket for Philadelphia.*

Papers for 1935 Annual Meeting

While there is still ample time for members and others who have in mind submitting technical papers for presentation at the 1935 annual meeting in Detroit to forward their offers to Committee E-6 on Papers and Publications, the committee will appreciate having the required information as far in advance of the limiting date for receipt of offers, February 23, as possible. All offers of papers must be accompanied by a summary which should make clear the intended scope and point out features that in the opinion of the author will justify its acceptance for presentation and discussion. The Committee on Papers will meet on February 25 and consider all offers before it.

Interesting Annual Meeting Planned

The Society's Thirty-eighth Annual Meeting, which is to be held in Detroit, at the Hotel Book-Cadillac, June 24 to 28, inclusive, promises to be a most interesting one. Pending further development of the technical program, details cannot yet be announced, but members should be very much interested in some of the general plans which were discussed at the recent meeting of the Executive Committee.

The opening session will probably be scheduled for Tuesday morning. The president will present his annual address at this time, the new officers will be announced and introduced, and a prominent Detroit executive will deliver the opening address. At the Tuesday evening session, there will be a series of papers and addresses on the subject "The Place of Materials in Automobile Roads and Rides." There are to be three formal papers discussing developments in highways, automobiles and tires, and outstanding authorities will participate in the discussion.

The Edgar Marburg Lecture and award of the Dudley Medal will comprise the Wednesday afternoon session and following the annual dinner Wednesday evening, the subject "housing developments" will be reviewed. Two addresses are scheduled—one to cover the subject generally, importance, financing, etc., and the other from a more technical viewpoint, types of dwellings and their features, new materials and the like. The discussion will indicate progress that is being made by other nations in solving housing problems.

The annual golf tournament will be held Thursday afternoon and at this time and on Friday afternoon and possibly Saturday a series of plant visits, trips to historic points, etc., will be available to those who wish to participate.

Meetings and Exhibit

The 1935 Exhibit of Testing Apparatus and Related Equipment under A.S.T.M. auspices will be in progress during the annual meeting. Already a number of firms have signified their intention of participating and interesting displays are being planned.

For the first time, the exhibit and annual meeting session rooms will be on the same floor, thus insuring a compact arrangement. The Book-Cadillac Grand Ballroom will be used for the various booths. Society committees will be invited to participate and there will be other displays of special equipment not produced commercially.

Committee on Arrangements

The personnel of the Detroit Committee on Arrangements, headed by A. E. White, Professor of Metallurgical Engineering, and Director, Department of Engineering Research, University of Michigan, with F. O. Clements, Technical Director, Research Laboratories, General Motors Corp., as Honorary Chairman, was announced in the December BULLETIN. The various groups will cooperate in plans for the program, entertainment, etc.

It is expected that many of the members' families will accompany them to the meeting and a Women's Entertainment Committee is developing a very interesting program. The ladies who comprise this committee are as follows:

Mrs. F. O. Clements, *Chairman*
 Mrs. L. E. Williams, *Vice-Chairman*
 Mrs. T. A. Boyd
 Mrs. A. R. Carr

Mrs. W. H. Graves
 Mrs. J. H. Hunt
 Mrs. J. L. McCloud
 Mrs. C. R. Thompson



Society Activities in 1934

Extensive Committee Work Outlined

AT THE beginning of a new Society year, it has been customary to present to the members, through the medium of the January BULLETIN, an article reviewing major accomplishments of A.S.T.M. for the preceding twelve months. This "stock-taking" has a very definite purpose—to give a general picture of A.S.T.M. work and its progress and to indicate what lies ahead.

Following the notes given below on 1934 Society activities as a whole, meetings, etc., there appears a review of particular committee developments. These sections are arranged so that a member interested in a particular materials field, can refer directly to this phase of the review.

Annual Meeting

The past year was a noteworthy one in Society history because it marked a definite turn for the betterment in a number of phases of our work which had temporarily been retarded by industrial conditions. Decreased attendance was noted at meetings held in 1933, but last year all of the meetings were better attended.

The annual meeting is of course the outstanding event of our year. The 1934 meeting at Atlantic City was featured by a large number of very worth-while technical papers and reports and the 1934 *Proceedings*, larger by some 400 pages than the preceding issue, indicate the great amount of technical data and information presented on a wide range of subjects. The papers given totaled 44 in number while some 44 committees presented reports.

Several of the reports were outstanding. That of Committee A-2 on Wrought Iron included a discussion of Quality Standards for Wrought Iron, on which subject the committee had been working for two years. Information was given covering characteristics, meaning of test results and features for judging quality.

The Report on Service Characteristics of the Light Metals and Their Alloys prepared by Committee B-7 after many months of intensive correlation and review has been heralded far and wide as a much needed pamphlet. This gives essential technical data and information on aluminum, magnesium and their alloys.

Several of the papers presented dealt with corrosion and creep problems of metals and a good deal of interest was noted in those in the concrete field, as well as the ones devoted to subjects of masonry. Of outstanding significance to the cement and concrete interests was an extensive discussion on cement composition in relation to strength, length changes, freezing, etc., of mortars and concrete. This was based on a research program of several years' duration involving many thousand tests. Mention should be made of another outstanding paper, covering in a comprehensive manner "Subgrade Soil Testing Methods." This subject is fast becoming one of major significance in highway design and construction. These two papers not only are of much interest to many technologists in the respective fields, but they make available considerable data of significance in committee specifications work, presenting a clearer picture of problems involved.

Several new and improved methods of testing were described indicating continuing interest and progress in this direction.

Regional and Other Meetings

The 1934 Regional Meeting held in Washington was very successful and the Symposium on the Outdoor Weathering of Metals and Metallic Coatings met with many favorable comments. The papers given were sponsored by Committees A-5 on Corrosion of Iron and Steel and B-3 on Corrosion of Non-Ferrous Metals and Alloys and did much to evaluate the extensive data developed by A.S.T.M. work in this field.

The group meetings of committees held in March were marked by over 150 meetings with a registration during the week of some 600, exceeding by far corresponding totals for the previous two years. A large number of new research and standardization activities were put under way as a result of these committee meetings.

Under the subject of meetings mention should be made of the session jointly sponsored by the Society and the American Foundrymen's Association at the 1934 A.F.A. Convention, at which several papers were given discussing "Cast Iron Tests and Specifications." A.S.T.M. Committee A-3 on Cast Iron took an active part in this joint meeting.

Standardization and Research

The past year was a very productive one from a standardization point of view. At the end of the year there was a total of 732 standards and tentative standards which had been given A.S.T.M. status. Of these 491 were official standards, while 241 were published as tentative. Of these totals 49 standards were adopted in 1934, and over 50 tentative standards were accepted.

An important phase of A.S.T.M. standards work is the submission of its standard and tentative specifications and tests to the American Standards Association for approval. This has been intensified during 1934 and 17 items were approved by A.S.A., bringing the total in this category to 85.

1934 has witnessed a larger number of Society committees taking advantage of the opportunity to submit, in the intervals between annual meetings, proposed standards and revisions of existing standards to Committee E-10 for approval and subsequent publication as tentative. This procedure makes it possible to issue new tentative standards as soon as they are developed by committees.

The October BULLETIN included a comprehensive summary of the 114 research projects on which A.S.T.M. committees are at work and the following sections of this review article also indicate the wide extent of this work—much of which was completed during 1934.

Publications

During 1934, the publications of the Society were probably distributed more widely than ever before, thus making the important data and information developed by A.S.T.M. of wider service and at the same time stimulating knowledge of the Society and its importance in the materials field. To the growing list of special compilations of standards, was added the publication "A.S.T.M. Standards on Coal and Coke," sponsored by Committee D-5. The committee reports mentioned above and the reports of the Joint Phosphorus



and Sulfur Committee, mentioned elsewhere in this BULLETIN, were important items in the list of publications.

The increasing use in engineering curriculums of several of the A.S.T.M. pamphlets and books indicates their value in educational work.

Committee Activities

The remainder of this article is devoted to a summary of important work which the various A.S.T.M. committees have carried out. The summaries which committee officers prepared each year are the basis for the respective sections. Activities in the various fields are segregated: iron and steel, first, followed by non-ferrous metals and the non-metallic materials and finally general testing.

Steel

Committee A-1 on Steel has made considerable progress in advancing its standardization program and through the activities of its subcommittees a number of new projects are under development. Three new tentative specifications, covering respectively, electric-fusion-welded steel pipe for high-temperature and high-pressure service; alloy-steel castings for valves, flanges and fittings, and seamless alloy-steel pipe for service at temperatures from 750 to 1100 F., are the result of an increasing demand for suitable purchase requirements for materials suitable for these severe service conditions. The tentative specifications for cold-rolled strip steel were extensively revised and detailed requirements for weights of zinc coatings were incorporated in the specifications for welded and seamless galvanized steel pipe for ordinary uses.

Seven tentative specifications for steel products were adopted as standard; four of these covering various types of fabricated pipe, two specifications for steel for bridges and for buildings, requiring a tensile strength range of 65,000 to 72,000 lb. per sq. in., and a specification for mild steel plates (55,000 to 65,000 lb. per sq. in. tensile strength). Important changes in the specifications for cold-drawn steel reinforcing wire and revised marking provisions for seamless and lap-welded steel and iron boiler tubes were also adopted as standard.

At the present time, the committee has a number of specifications under development, including, concrete reinforcement bars rolled from axle steel; still tubing for refinery service; alloy-steel bolts, forgings and pipe flanges, and a recommended practice for conditioning of rolled surfaces of structural steel by welding. Specifications for nuts are being drafted, one to cover temperatures to 750 F. and the other to 1100 F. Mention should be made of the studies to develop high-temperature data, in connection with these several specifications, covering materials for use at elevated temperatures. Requirements for fabricated reinforcement material such as mesh and bar mats are being developed as a result of a request for such specifications.

Modifications of the specifications for alloy-steel castings for structural purposes and carbon-steel castings for industrial, railroad and marine uses will probably be proposed during the year and their adoption as standard is being considered by the subcommittee in charge. Revisions which may be proposed in Tables I and II of the tentative specifications for lap-welded and seamless steel and lap-welded iron boiler tubes involve additions in the number of sizes and wall thicknesses.

A contemplated consolidation of methods of analyzing

normal carbon and alloy steels and procedures covering also cast iron and wrought iron will avoid considerable repetition in these analogous chemical procedures and be a convenience to analysts who work with ferrous metals. A survey is also being made of physical test methods for steel and consideration is being given to the relation of these tests to the steel specifications.

During the year, studies have been carried out on impact properties of die-casting die steels at temperatures from 70 to 800 F. Comparison of the impact values with the known performance of steels with regard to "heat checking" under service conditions indicates that high impact values at elevated temperatures do not conclusively indicate improved resistance to "heat checking." Further studies are under way to determine what combinations of properties have closest relation to "heat checking" as encountered in dies, and when these can be determined, specifications to attain the desired properties may be formulated.

Wrought Iron and Cast Iron

Committee A-2 on Wrought Iron completed a very timely and valuable report covering such factors as physical properties, chemical composition and internal structural characteristics by which the quality of wrought iron may be distinguished. This report entitled "Quality Standards for Wrought Iron," is available in a reprint booklet. It is proving of considerable service to both the consumers and producers through promoting a better understanding of the underlying characteristics of wrought iron and the significance of the metallographic and physical test results.

The committee has completed two specifications for wrought-iron sheets, galvanized and uncoated, respectively. These are now the subject of committee letter ballot as possible tentative specifications. The zinc-coated sheet specifications cover material for use in culverts, roofing and siding, for corrugating and moderate forming operations and include four classes of galvanized coatings applied by the hot-dip process. The uncoated sheet specification covers wrought-iron sheets for similar applications.

The work of harmonizing and improving the requirements of the various specifications for wrought-iron products is continuing and it is expected that in the 1935 report a number of desirable revisions will be presented.

Committee A-3 on Cast Iron reported the results of some completed cooperative tests on methods of making and correlation of test bar sizes, together with flexural properties and tensile strength data to provide a check on the provisions of the existing specifications for gray-iron castings. Completion of further studies now under way is expected to result in improvements in the castings specifications, making them of greater value. Consideration is being given to the formulation of specifications for light gray-iron castings and new specifications for pig iron. Committee A-3 cooperated in the arrangements for the joint meeting of the American Foundrymen's Association and A.S.T.M., held at the International Foundry Congress in October, at which a series of four papers were presented dealing with "Cast Iron Tests and Specifications."

Magnetic Testing

Committee A-6 on Magnetic Properties concluded extensive improvement in the complete list of definitions with units and symbols relating to magnetic testing. In formulating these

(Continued on page 11)



II. Long-Time Society Committee Members

Second in the Series of Notes on Long-Time A.S.T.M. Members

MENTION was made in the December BULLETIN of a series of articles to appear in the 1935 issues of the A.S.T.M. BULLETIN comprising notes of outstanding activities of members of the Society who have in general been affiliated with it for twenty-five years or more and who have taken an active part in committee work over long periods of time. Notes on three members were given in the December BULLETIN and this plan will be followed in the series. No particular sequence will be adhered to.



R. S. MACPHERRAN, Chief Chemist, Allis-Chalmers Manufacturing Co., has been identified with the iron and steel industry for over forty years and has been a member of A.S.T.M. since 1902. After receiving his technical education at the Universities of Wisconsin and Michigan, he was associated with the Illinois Steel Co. and in 1895 became connected with the former E. P. Allis Co., Milwaukee. After a year, 1907, with the Case Threshing Machine Co., he returned to the Allis-Chalmers Manufacturing Co. and has been with that organization since that time in charge of its chemical and physical laboratories.

He has been particularly active in the field of gray iron and in 1931 received the J. H. Whiting Gold Medal, award of the American Foundrymen's Association, recognizing his many valuable contributions to the foundry industry.

In the Society he has been very diligent in committee work. His membership on Committee A-3 on Cast Iron dates from its organization in 1903 and he has been on Committee A-1 on Steel for twenty years. He takes an active interest also in the work of Committee B-2 on Non-Ferrous Metals and Alloys, Committee A-4 on Heat Treatment of Iron and Steel and Committee D-5 on Coal and Coke. He was chairman of Committee A-3 for the period 1926-1928.

As the Chairman of the Special Subcommittee on Test Bars, of Committee A-3, Mr. MacPherran is in charge of an extensive current research activity. The considerable amount of data already developed is a part of the 1934 annual report of the Committee.

His continuous and important investigations of ferrous metals have resulted in a number of contributions on metallurgy of both gray iron and steel before meetings of the Society and other associations.



C. P. VANGUNDY, Engineer of Tests, Baltimore & Ohio Railroad Co., has been associated with his company for forty-three years. After graduating in the chemical course, University of Illinois, he was assistant chemist for two years, the Baltimore & Ohio Railroad, and then for two years was chief chemist with Laughlin and Co., Pittsburgh. From 1892 to 1920 he was Chief Chemist, Baltimore & Ohio Railroad Co., then becoming Water Engineer, which position he held until becoming Engineer of Tests in 1925.

As Water Engineer, Mr. Van Gundy directed important studies of the water supply of the railroad and supervised the installation of water treating plants throughout the system.

He has been active in a number of phases of A.S.T.M. work. A member since 1903, he began committee service on D-1 on Preservative Coatings for Structural Materials in 1908. This was followed by membership on Committee A-1 in 1912 in which he was interested in the work on chemical analysis. He also has served continuously on Committee D-2 on Petroleum Products and Lubricants since 1914; was chairman 1915-1926, and honorary chairman 1926-1928. He is interested in the work of Committee A-2 on Wrought Iron and several sectional committees sponsored by A.S.T.M. under A.S.A. procedure.

Mr. Van Gundy has been active in the work of the Rail Committee and the Water Service Committee of the A.R.E.A. and was the first secretary of the Maryland Section of the American Chemical Society.



F. N. SPELLER, Director, Department of Metallurgy and Research, National Tube Co., has the unique distinction of having served on A.S.T.M. Committee A-1 on Steel longer than any other member, his affiliation beginning in 1905 as the representative of his company. A native of Canada, Doctor Speller received the degree of Doctor of Science from the University of Toronto and was chemist of the city of Toronto, 1894-1896, then becoming associated with the Canadian Steel Co. This was followed by mining engineering work in Alaska and association with the Bureau of Mines of Canada. He began his long record of service with the National Tube Co., at McKeesport, Pa., in 1901. He became metallurgical engineer in charge of research work and specifications in 1904, serving in that position until 1926 when he assumed his present position.

Doctor Speller's name is synonymous with outstanding research work on corrosion problems and he has been awarded the Longstreth Medal of the Franklin Institute and in 1934 delivered the annual Howe Memorial Lecture of the A.I.M.E. discussing "The Corrosion Problem with Respect to Iron and Steel." He has presented a number of papers on this and related subjects and his book on "Corrosion" has added greatly to the knowledge on this subject.

A member of A.S.T.M. since 1904, he has been very active in committee work since he was affiliated with Committee A-1 in 1905. Since its organization in 1906, he has served on Committee A-5 on Corrosion of Iron and Steel and has been vice-chairman of this latter group since 1926. Doctor Speller was a member of the Society's Executive Committee, 1927-1929. As the chairman of Subcommittee XXI on Welding of Committee A-1 from its organization in 1923 to 1934, he has directed important specification work. He holds membership on Committees D-1 on Preservative Coatings and D-19 on Analysis of Industrial Waters and is active in several sectional committees.



BULLETIN

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January 31, 1935

An Encouraging Year

IT IS difficult to evaluate exactly how the Society progressed during 1934, but this can be said without reservation—viewed as a whole it was an *encouraging year*.

While the March BULLETIN will include a detailed statement of the Society's financial condition, it is of interest now to note that the 1934 income amply exceeded disbursements. This is encouraging, especially so when it is realized how much more extensive were the *Proceedings*, Supplement to the Book of Standards and Year Book than for previous years; the publication costs were considerably influenced by the higher prices prevailing for paper, printing, etc.

To an increasing extent the sale of A.S.T.M. books is adding to the income. This factor was especially marked in 1934 when receipts from this source were the largest in our history, accounting for much of the favorable balance mentioned above.

This extension of the use of A.S.T.M. publications should be heartening to the committees and members who have contributed so much to make them so outstanding. It definitely is indicative of their value and further, from a promotional standpoint, this increased distribution has far-reaching results. The increased knowledge of A.S.T.M. purposes and work which has been marked during the year is most heartening.

During 1932 and 1933 there was a noticeable slowing up of certain committee projects—an extremely modest curtailment in view of the severity of governing conditions—nevertheless it is very cheering to record a definite, decided upswing in the number and intensity of standardization and research activities.

Our membership work definitely met with better results due in part to a lessening in "sales resistance," but it is of major importance that the number of members be increased.

All in all—standardization, research, wider appreciation of A.S.T.M.—and in other ways, 1934 was an encouraging year for the Society.

The Dark and the Bright

AS THE chairman of the A.S.T.M. Membership Committee, I propose to discuss briefly through the medium of this BULLETIN, a question which is of considerable importance to all of us. I refer to the Society membership picture. Latest information at the close of 1934 shows that we are back to the 1924 figure as far as totals go. In other words, A.S.T.M. is carrying on with a membership barely better than it was ten years ago. That the greatly increased work is going forward satisfactorily in spite of curtailed income, indicates excellent efficiency. As regards net increase, for the fourth time in the Society's history this turned out to be a negative value—beginning with 1931 and each succeeding year the number of new members was less than those forced to withdraw. This is the darker side of the picture.

Now as is the case with practically all pictures there is a brighter part, and I am frank to say I believe the brighter shades became more predominant last year. For one thing our net loss was a great deal less than any of the three preceding years, being only 40, whereas in 1933 there was a net loss of 420. But the really bright side is that the number of new members in 1934 was well ahead of '32 and '33. That is the most significant feature of the picture.

Now our path for this year is well charted—what we have to do is to proceed straight ahead—only at a faster rate. We need acceleration, additional momentum.

There are many prospective members needing just a cordial invitation and perhaps a bit more information. Last year about 100 such wrote to the Society asking that they be sent blanks, etc., so they would know what A.S.T.M. is doing, and a third of these men are now members!

All of us are in contact almost every day with organizations which should be represented in the Society, or individuals who should profit from being in A.S.T.M. Each member can do something—extend invitations and follow them through, or inform me or the A.S.T.M. office of people who might be contacted for membership, and numerous other ways.

This is a big problem, but the Society has solved other difficult ones and will this one. We have a lot to offer—all our standardization and research work, our valuable publications—just glance at the review article in this issue and before you put this BULLETIN down look at the list of new members, 49 of them, 25 per cent better than our January list last year.

We have completed an encouraging year—the membership picture is bright to start with and I express the thoughts of our officers when I urge each of you to do all that you can to make 1935 a thoroughly successful membership year.

K. B. Cook

Chairman, Membership Committee.

P.S.—Members realize, of course, that the next few months are the best ones in which to get new members. Each of us should "strike hard" now!



BULLETIN
January, 1935

Cleveland District Committee Reorganizes

At a recent meeting of the A.S.T.M. Cleveland District Committee, a reorganization plan was effected in accordance with the provisions of the new charter for district committees as reported in the December BULLETIN, and steps were taken to initiate the committee's work.

The personnel of the Cleveland District Committee and its Akron and Youngstown Divisions is as follows:

CLEVELAND DISTRICT COMMITTEE

D. M. Avey, Editor, *The Foundry*.
H. M. Boylston, Professor of Metallurgy, In Charge of Department of Metallurgical Engineering, Case School of Applied Science.
F. C. Elder, Metallurgist, American Steel and Wire Co.
J. V. Emmons, Metallurgist, The Cleveland Twist Drill Co.
Zay Jeffries, Consulting Metallurgist, Aluminum Co. of America.
C. B. Murray, President, Crowell & Murray, Inc.
H. A. Schwartz, Manager of Research, National Malleable and Steel Castings Co.
A. J. Tuscany, Executive Secretary, National Code Authority for the Gray Iron Foundry Industry.
E. E. Ware, General Superintendent, Varnish Manufacturing, The Sherwin-Williams Co.

AKRON DIVISION

J. J. Allen, Chief Chemist, Mechanical Rubber Goods Division, The Firestone Tire and Rubber Co.
Arthur W. Carpenter, Manager of Testing Laboratories, The B. F. Goodrich Co.
E. G. Kimmich, The Goodyear Tire and Rubber Co.

YOUNGSTOWN DIVISION

L. B. Grindlay, Manager, Metallurgical Depts., Republic Steel Corp.
Fred Hubbard, Consulting Engineer, The Standard Slag Co.
G. A. Reinhardt, Director, Metallurgy and Research, The Youngstown Sheet and Tube Co.

H. A. Schwartz, who has served as chairman of the committee since its organization, was reelected to the office and A. J. Tuscany was chosen secretary.

As a result of the reorganization meeting, plans are under way for the holding of a joint meeting to which will be invited members of other societies and engineering groups who are interested in the Society's standardization program. It is planned to develop a symposium in which the importance and utility of this phase of the Society's work will be discussed.

Committee on Shipping Containers Meets

A meeting of A.S.T.M. Committee D-10 on Shipping Containers was held in New York City in December, at which a number of important actions were discussed. These have been referred to the members of the committee and approved.

When this committee was organized, there was a need for the development of specifications for shipping containers, but since the necessity for the Society doing this type of work has largely passed, the committee has decided to discontinue its work on specifications. The committee believes that its work can be of great value to the various industries by correlating and standardizing methods of test, and to this end the committee plans to expand its personnel and to push this phase of its work.

The committee will recommend to the Society that the four specifications it has developed covering various types of shipping containers be withdrawn inasmuch as they have served their purpose.

Mr. Edward Dahill, Jr., Chief Engineer, Freight Container Bureau, Association of American Railways, was elected chairman of the committee, succeeding J. A. Newlin. C. A. Plaskett, Senior Engineer, U. S. Forest Products Laboratory, will continue as secretary.

New Tentative Standards Approved

On the recommendation of Committees C-1 on Cement and C-8 on Refractories, the Society's Committee on Standards has approved by letter ballot action the publication of several new tentative standards and a number of changes in existing standards. A list of the recommendations follows:

NEW TENTATIVE STANDARDS

Method of Test for Fineness of Portland Cement by Means of the Turbidimeter (C 115 - 34 T)
Methods of Chemical Analysis of Portland Cement (C 114 - 34 T)
Specifications for Clay Fire Brick for Malleable Furnaces with Removable Bungs and for Annealing Ovens (C 63 - 34 T)
Specifications for Clay Fire Brick for Stationary Boiler Service (C 64 - 34 T)
Method of Test for Permanent Linear Change After Reheating of Refractory Brick (C 113 - 34 T)

REVISIONS OF TENTATIVE STANDARDS

Methods of Test for Particle Size of Ground Refractory Materials (C 92 - 32 T)
Specifications for Refractories for the Construction of Incinerators (C 106 - 34 T)

TENTATIVE REVISIONS OF EXISTING STANDARDS

Method of Test for Refractory Materials Under Load at High Temperatures (C 16 - 20)
Method of Test for Softening Point of Fire-Clay Brick (C 24 - 33)

WITHDRAWAL OF STANDARDS

Specifications for Clay Fire Brick for Malleable Furnaces with Removable Bungs and for Annealing Ovens (C 63 - 28)
Specifications for Clay Fire Brick for Stationary Boiler Service (C 64 - 28)

The new tentative standards will fill a very definite need in the industries involved. Because of increased fineness in grinding of present-day cements and the necessity of having a generally accepted standard method of applying the turbidimeter, which is used rather widely in fineness determinations, Committee C-1 developed the new tentative standard first listed. Since a number of differences have resulted in the chemical analysis of portland cement, the need for an accepted standard method of analysis has been pressing and after considerable study Committee C-1 has developed a proposed method.

The test for permanent linear change after reheating of refractory brick has been used rather widely and the desirability of a standard method for conducting it has been apparent. The specifications covering clay fire brick for malleable furnaces and for stationary boiler service are issued as new tentative standards to replace the existing standard specifications. The new specifications cover the new panel spalling test instead of the obsolete water-dip test.

A copy of the new tentative standards will be furnished members of the Society without charge. The coupon given below may be used in obtaining copies.

AMERICAN SOCIETY FOR TESTING MATERIALS
260 S. Broad St., Philadelphia, Pa.

Gentlemen:

Kindly send me a copy of the following new tentative standards:

- ☐ Clay Fire Brick for Malleable Furnaces (C 63 - 34 T)
- ☐ Clay Fire Brick for Stationary Boilers (C 64 - 34 T)
- ☐ Permanent Linear Change of Refractory Brick (C 113 - 34 T)
- ☐ Fineness of Portland Cement by the Turbidimeter (C 115 - 34 T)
- ☐ Chemical Analysis of Portland Cement (C 114 - 34 T)

Member.....

Address.....

(KINDLY PRINT NAME)



Concrete Institute to Meet in New York

The Thirty-first Annual Convention of the American Concrete Institute will be held at the Roosevelt Hotel, New York City, February 19 to 21 inclusive. An interesting program has been developed and an invitation is extended members of the A.S.T.M. to attend the convention. Special railway rates are in effect. More detailed information about the program, etc., may be obtained from A.S.T.M. Headquarters or by writing the American Concrete Institute, 7400 Second Boulevard, Detroit, Mich.

Reports Available on Caustic Embrittlement

An important activity of the Boiler Feed Water Studies Committee, of which A.S.T.M. is one of the sponsors, is the development of extensive research work on caustic embrittlement at the Non-Metallic Minerals Experiment Station of the U. S. Bureau of Mines, maintained in cooperation with Rutgers University at New Brunswick, N. J. Considerable information has resulted and four progress reports have been prepared, the most recent two having been presented at the A.S.M.E. meeting in New York City. Copies of these reports can be obtained without charge from the A.S.M.E. Office, 29 W. Thirty-ninth Street, New York City.

The funds for this work have been contributed by a large number of boiler users and by the insurance companies, and it is expected the results will add greatly to knowledge of the subject.

The work is sponsored by a subcommittee with the following personnel:

J. H. Walker, *Chairman*
Alex D. Bailey
R. C. Bardwell
R. E. Hall
D. B. Keyes

E. B. Powell
Sheppard T. Powell
T. E. Purcell
J. B. Romer
R. C. Stratton

Nine Standards Approved by A.S.A.

The American Standards Association has recently approved nine A.S.T.M. standards. Of these listed below, the first five, covering certain ferrous and non-ferrous metals products, were submitted under the proprietary standards method. The first three standards are under the jurisdiction of Committee A-1 on Steel, while Committee B-5 on Copper and Copper Alloys, Cast and Wrought, is in charge of the two non-ferrous standards.

The remaining four pertaining to electrical insulating materials were approved on the recommendation of the Sectional Committee on Electrical Insulating Materials which is sponsored by the Society and functions under A.S.A. procedure.

STANDARDS	DESIGNATION	
	A.S.T.M.	A.S.A.
Carbon-Steel Castings for Valves, Flanges, and Fittings for High-Temperature Service.....	A 95 - 33	G17.1 - 1934
Alloy-Steel Bolting Material for High-Temperature Service.....	A 96 - 33	G17.2 - 1934
Forged or Rolled Steel Pipe Flanges for High-Temperature Service.....	A 105 - 33	G17.3 - 1934
Copper Water Tube.....	B 88 - 33	H23.1 - 1934
Free-Cutting Brass Rod for Use in Screw Machines.....	B 16 - 29	H8 - 1934
Molded Materials Used for Electrical Insulation.....	D 48 - 33	C59.1 - 1935
Electrical Insulating Oils.....	D 117 - 33	C59.2 - 1935
Resistivity of Insulating Materials.....	D 257 - 33	C59.3 - 1935
Rubber Matting for Use Around Electrical Apparatus or Circuits Not Exceeding 3000 Volts to Ground.....	D 178 - 24	C59.4 - 1935

Schedule of Committee Meetings

DATE	COMMITTEE	PLACE
February 18....	C-1 on Cement.....	New York City
	Joint Committee on Pig Iron Qualities.....	New York City
February 18-21....	C-9 on Concrete and Concrete Aggregates.....	New York City
February 19....	C-8 on Refractories.....	Buffalo, N. Y.
February 20....	Sectional Committee on Classification of Coals.....	New York City
February 22-23....	Joint Committee on Concrete and Reinforced Concrete.....	New York City
February 25....	E-6 on Papers and Publications.....	Philadelphia
February....	B-4 on Electrical-Heating, Electrical-Resistance and Electric-Furnace Alloys.....	New York City
March 4-8....	SPRING GROUP MEETINGS OF COMMITTEES.....	Philadelphia
April 9....	Executive Committee.....	Philadelphia

A.I.M.E. Annual Meeting

The annual meeting of the American Institute of Mining and Metallurgical Engineers is to be held in the Engineering Societies Building, New York City, February 18 to 21, with a large number of interesting papers and reports scheduled for presentation. The Howe Memorial Lecture will be delivered in the afternoon of February 21 by Earl C. Smith, Chief Metallurgist, Republic Steel Corp., who will discuss his studies of milling slag refractories, and also non-metallies in the manufacture of alloy steel.

Significance of Test of Concrete

At the 1933 annual meeting there was presented a Report on the Significance of Tests of Concrete and Concrete Aggregates the preparation of which was sponsored by Committee C-9 on Concrete and Concrete Aggregates, a special committee being assigned the responsibility for developing it consisting of R. W. Crum, Director, Highway Research Board, National Research Council, *Chairman*; A. T. Goldbeck, Director, Bureau of Engineering, National Crushed Stone Assn., F. H. Jackson, Senior Engineer of Tests, U. S. Bureau of Public Roads. It had been hoped to publish this report early in 1934, but this has been unavoidably delayed. The report, however, is now being put in type and it is expected copies will be available in the near future.

The report consists of seventeen sections, each being prepared by an authority on the respective subject. Ten of the sections cover testing of concrete, while there are six devoted to the various phases of testing of concrete aggregates. The report is completed by a section devoted to the discussion of the number of specimens or tests required for reasonable accuracy of the average.

While each section of the report was prepared by an individual member of the committee, the whole has been referred to the entire Committee C-9 membership so that in its final form this publication will represent the consensus of opinion of leading experts. The report is considered a very useful and timely one, presenting as it does authoritative statements of the present knowledge in this field of testing.

Members of the Society may obtain a copy of the report on request, without charge, and additional copies may be purchased at the special members' price of \$1. The list price is \$1.25. The publication comprises some 128 pages.



Specification Tolerances to be Studied

From time to time there has been discussed the question of interpretation of specification requirements and since there is an urgent need for full consideration of the subject, particularly in securing uniformity in A.S.T.M. standards concerning requirements and tolerances in specifying chemical and physical properties, a committee has been organized to study the matter critically. Dr. J. A. Gann, Chief Metallurgist, The Dow Chemical Co., is chairman of the group, which will function as a technical committee of Committee E-1.

The new committee will study and formulate recommendations to result in uniform methods of indicating requirements on physical and chemical properties specified in A.S.T.M. standards and the scope is intended also to include the preparation of statements indicating how these requirements are to be interpreted in the acceptance or rejection of material.

Each standing committee of the Society has been invited to designate a representative on the new group. The men appointed to form a nucleus of the personnel are as follows:

J. A. Gann, The Dow Chemical Co.
H. V. Churchill, Aluminum Co. of America.
H. F. Dodge, Bell Telephone Laboratories, Inc.
Anson Hayes, American Rolling Mill Co.
E. F. Kenney, Bethlehem Steel Co., Inc.
G. E. F. Lundell, National Bureau of Standards.
H. F. Moore, University of Illinois.

John Alexander Mathews

The death on January 11 of Dr. J. A. Mathews removed from the ranks of the Society a loyal member who had twice served A.S.T.M. as an officer—he was a member of the Executive Committee, 1915–1917 and again in 1924–1926. Doctor Mathews was Vice-President and Director of Research, Crucible Steel Co. of America, and was a metallurgist of world-wide fame, contributing many notable achievements, especially in the production of various types of tool and other high quality steels.

He was a graduate of Washington and Jefferson College and Columbia University, receiving his Ph.D. from the latter in 1898. From 1908 to 1920 he was affiliated with the Halcomb Steel Co., becoming President in 1913. He was President of the Crucible Steel Co., 1920–1923 when he assumed the duties which he held at the time of his death. Doctor Mathews received a number of medals and other honors including the Robert W. Hunt Medal of the A.I.M.E. He was an Honorary Member of the American Society for Metals and in 1924 was A.I.M.E. Howe Lecturer.

In the Society he had served on Committee A-1 on Steel since 1911 and was a member of Committee A-10 on Iron-Chromium, Iron-Chromium-Nickel and Related Alloys, and the Joint A.S.M.E.–A.S.T.M. Research Committee on Effect of Temperature on the Properties of Metals.

With a friendly personality and pleasing manner which made him a patient teacher and scientific leader, his loss will be keenly felt by his many friends in the Society.

Address Wanted

Anyone knowing the present address of the following member, whose last known address is given below, is asked to notify the Secretary-Treasurer:

SERGE SCHEER, Civil Engineer, 79 Avenue des Champs-Élysées, Paris, France.

Petroleum Committee Meets

At the meetings of Committee D-2 on Petroleum Products and Lubricants, held in New York on January 10 and 11, a number of interesting activities were discussed. The Section on Gum in Gasoline reported work in progress on the preparation of accelerated oxidation tests for determining gum stability and on the correlation of laboratory tests with actual storage results. The Subcommittee on Grease had a successful meeting at which demonstrations were given of various grease testing instruments. This group is at present working on the consistency of soft greases and determination of softening point by (a) dropping point and (b) use of a grease cube on mercury bath.

A new proposed federal purchase specification comprising thirteen distinct motor fuels was carefully considered and while the form and principle of the specification was endorsed, discussion of the specification limits indicated the desirability of further consideration. The subcommittee studying the Slight oxidation tests has a program of cooperative testing under way and expects to submit shortly for information a revised description of the test.

Committee D-2 announced that its annual dinner will be held during the annual meeting of the Society in June in Detroit, the guest of honor being Dr. George W. Gray, Assistant Manager, Refining Department, The Texas Company, who has been a member of the Society and of the committee since 1913. A number of changes in personnel were approved. L. C. Beard, Socony-Vacuum Oil Co., Inc., succeeds T. G. Delbridge, The Atlantic Refining Co., as secretary of Technical Committee A and H. M. Hancock, Atlantic Refining Co., was appointed chairman of the Committee on Public Relations. L. L. Davis, Continental Oil Co., succeeds D. P. Barnard, Standard Oil Co. (Indiana), as chairman of Section IV on Service Change of Technical Committee B on Motor Oils.

Effect of Sulfur on Forging Steel

During the past year, the Joint Committee on Investigation of the Effect of Phosphorus and Sulfur in Steel issued a report on the effect of added phosphorus on low-carbon steel and now there has been published as a reprint from the 1934 *Proceedings*, its Report on Effect of Sulfur on Forging Steel. This deals with simple carbon forging steels containing residual sulfur in progressively increasing amounts. The steels studied were of a quality intended for ordinary uses. The purpose of the work is to determine the effect of sulfur on those properties of steels at room temperature which may affect service behavior. The report discusses the manufacture of the materials, including heat treatment and chemical composition. The extensive test data are effectively summarized by diagrams which cover tensile properties, Charpy impact values and torsion, bend and hardness properties.

While the full import of this investigation can be realized only by a careful study of the twenty-six-page report, it is indicated that the evidence seems to show no systematic relation between increasing sulfur content and the physical properties studied, pointing to the conclusion that physical effects of residual sulfur in this grade of steel are of the magnitude such that they are masked by other more potent variables.

Extra copies of this report are available in separate form at the special price to members of 40 cents.



Proposed Specifications for Lead-Coated Copper Sheets¹

There appears below the first of the proposed specifications to be published as information in the BULLETIN under the plan announced by the Committee on Papers and Publications to use this publication as the medium for making available to the membership drafts of new specifications, methods of testing and definitions before they are submitted to the Society for promulgation as tentative.—Editor.

These are proposed specifications and are published as information only. Suggestions for revision are solicited and should be addressed to the Headquarters of the Society, 260 S. Broad St., Philadelphia, Pa.

1. **Scope.**—These specifications cover lead-coated sheet copper for architectural uses. It is supplied in two types according to the method of manufacture, and in three classes according to the weight of coating.

2. **Types.**—The lead coating shall be applied to the sheet copper as follows:

Type I.—By application of molten lead, or

Type II.—By electrodeposition.

3. (a) **Classes.**—Except as may be specified under Paragraph (c), the following weights of lead coating shall apply for either Type I or Type II:

WEIGHT OF LEAD COATING, LB. ^a		MIN.	MAX.
Class			
Class A	Standard (for general utility)	12	15
Class B	Heavy	20	30
Class C	Extra Heavy	40	50

^a In all classes the weight of coating, as designated, is the total weight of lead applied to two sides of 100 sq. ft. of copper sheet, approximately one half of the coating to be on each side of the sheet.

(b) Sheets specified to be coated on one side only shall have half the weights of lead coating designated in Paragraph (a).

(c) Other variations in coating or texture may be furnished under special written agreement.

MATERIAL

4. **Copper.**—The copper sheet shall be made from copper having a purity of 99.900 per cent as determined by electrolytic assay, silver being counted as copper, conforming to the requirements of the Standard Specifications for Lake Copper Wire Bars, Cakes, Slabs, Billets, Ingots and Ingot Bars (A.S.T.M. Designation: B 4)² or the Standard Specifications for Electrolytic Copper Wire Bars, Cakes, Slabs, Billets, Ingots and Ingot Bars (A.S.T.M. Designation: B 5)² of the American Society for Testing Materials.

5. (a) **Lead.**—The lead shall conform to the requirements of either Grades II or III of the Tentative Specifications for Pig Lead (A.S.T.M. Designation: B 29–34 T) of the American Society for Testing Materials.³

(b) For Type I coating the lead shall be free from impurities other than those permitted in accordance with Paragraph (a), except that not more than 4 per cent of tin and a trace of phosphorus is permitted.

(c) For Type II coating the lead shall be free from impurities other than those permitted in accordance with Paragraph (a).

MANUFACTURE

6. **Manufacture.**—The sheet copper used for lead coating may be finished by hot rolling, by hot and cold rolling and

annealing, or by cold rolling. Unless otherwise specified, the lead coating shall be applied to the sheet before forming.

7. **Temper.**—Lead-coated sheet copper shall be furnished as soft (roofing temper) or hard (cornice temper), the purchaser to specify whether soft material or hard material should be supplied.

PERMISSIBLE VARIATIONS IN WEIGHTS AND DIMENSIONS

8. (a) **Weights.**—The minimum weights of lead-coated sheet copper shall conform to the following requirements:

NOMINAL WEIGHT OF BARE COPPER SHEETS, ^a OZ. PER SQ. FT.	MINIMUM WEIGHTS OF LEAD-COATED SHEETS, ^a OZ. PER SQ. FT.		
	CLASS A	CLASS B	CLASS C
24	24.7	26.0	29.2
20	20.9	22.2	25.4
18	19.0	20.3	23.5
16	17.1	18.4	21.6
14	15.2	16.5	19.7

^a The above weights are based on the minimum weights for copper sheets in case lots (95 per cent) and the minimum weights of lead coatings as given in Section 3.

(b) **Width.**—The permissible variations in width for sheets shall be as follows:

WIDTH, IN.	PERMISSIBLE VARIATIONS, IN.	
Up to and including 5	+0.025	—0
Over 5 to 14, inclusive	+0.050	—0
Over 14	+0.125	—0

(c) **Length.**—Sheets ordered to exact lengths may have a variation of $\pm \frac{1}{8}$ in. in length.

WORKMANSHIP AND FINISH

9. **Workmanship and Finish.**—Lead-coated copper sheet shall be uniform in quality and temper, clean, smooth, commercially straight or flat, and free from injurious defects.

PACKING AND MARKING

10. (a) **Packing.**—Lead-coated copper sheets shall be packed in accordance with good commercial practice in order to protect them from injury and loss during shipment.

(b) **Marking.**—Shipping containers shall be marked with the name and/or brand of the manufacturer, the size, number and nominal (copper) weight of the sheets and the weight of the coating, and the purchase order number. When required, individual sheets shall be marked with the name and/or brand of the manufacturer and the weight of the coating.

INSPECTION AND REJECTION

11. (a) **Inspection.**—The manufacturer shall afford the inspector representing the purchaser, without charge, all reasonable facilities to satisfy him that the material is being furnished in accordance with these specifications.

(b) **Rejection.**—Individual sheets may be rejected by the inspector for obvious visual defects in the coating.

(c) Material which fails to conform to these specifications will be rejected and the manufacturer shall be notified.

METHODS OF SAMPLING AND TESTING

12. **Chemical Analyses.**—The chemical requirements specified in Sections 4 and 5 shall be determined only on special request and the analyses shall be carried out in accordance with the following methods of test of the American Society for Testing Materials:

¹ Under the standardization procedure of the Society these specifications are under the jurisdiction of the A.S.T.M. Committee B-2 on Non-Ferrous Metals and Alloys.

² 1933 Book of A.S.T.M. Standards, Part I, pp. 568 and 573.

³ Proceedings, Am. Soc. Testing Mats., Vol. 34, Part I, p. 662 (1934); also 1934 Book of A.S.T.M. Tentative Standards, p. 155.



(a) *Copper*.—Standard Methods of Battery Assay of Copper (A.S.T.M. Designation: B 34);¹

(b) *Lead*.—Standard Methods of Chemical Analysis of Pig Lead (A.S.T.M. Designation: B 35).¹

13. **Weight of Coating Test.**—When testing is specified, the determination of the weight of the lead coating shall be carried out in accordance with one of the three following methods. Unless otherwise specified, Method No. 1 shall be used:

(a) *Method No. 1.*—Ten sheets selected at random from each class of lead-coated sheets to be furnished shall be weighed before and after coating and the weight of the coating shall be calculated from the difference on the basis of the ordered size.

(b) *Method No. 2.*—One sheet shall be selected at random from each class of lead-coated sheets furnished. Four representative samples $2\frac{1}{4}$ by $2\frac{1}{4}$ in. shall be cut from each sheet, uniformly spaced along a diagonal, the end samples being taken not less than 1 in. from the edge. The four samples of each class of sheet so obtained shall be completely dissolved. The copper shall be determined by electrolytic assay. The weight of the lead coating shall be taken as the difference between the total weight of the samples and the weight of copper found. If necessary, a separate assay may be made for the tin.

(c) *Method No. 3.*—One sheet shall be selected at random from each class of lead-coated sheets furnished. Four representative samples $2\frac{1}{4}$ by $2\frac{1}{4}$ in. shall be cut from each sheet, uniformly spaced along a diagonal, the end samples being taken not less than 1 in. from the edge. After removing the burrs, each sample shall be cleaned and finally rinsed with alcohol and ether. The weight of the lead-coated sheet and the weight of the coating shall be obtained from measurements carefully taken of the specific gravity or density of these samples as determined by the usual method of weighing in air and water. Calculations may be made from the following formulas:

$$\text{Weight of lead coating, lb. per 100 sq. ft.} = (29.1 - \frac{259}{D}) W$$

$$\text{Weight of bare copper sheet, oz. per sq. ft.} = (\frac{41.5}{D} - 3.66) W$$

where W = weight of a sample in air in grams;

D_t = density of water at room temperature;

$$D = \text{density of sample} = \frac{W \times D_t}{W - M} \text{ and}$$

M = weight of the sample in water in grams.

¹ 1933 Book of A.S.T.M. Standards, Part I, pp. 580 and 791.

Society Activities in 1934

(Continued from page 4)

definitions, the committee realized that this nomenclature will be used not only by scientists and engineers but also by non-technically trained men, and it was accordingly thought essential to modify and amplify some of them. The definitions are in general conformity with the definitions on magnetism included in the proposed American Standard that has been prepared by the Sectional Committee on Definitions of Electrical Terms, functioning under the procedure of the American Standards Association.

The committee is now undertaking a revision of the present standard methods of magnetic testing so as to provide suitable procedures for testing newly developed steels having pronounced directional characteristics with respect to magnetic properties and for testing the new magnet steels having very high values of coercive force.

Corrosion of Iron, Steel and Non-Ferrous Metals

Committee A-5 on Corrosion of Iron and Steel is continuing various important field tests on uncoated and metallic-coated ferrous metals exposed to the atmosphere and salt water. These tests have all run for considerable periods of time and interesting corrosion data are being obtained and published annually in the reports of the committee.

Additional failures of the uncoated Nos. 16 and 22 gage steel sheets, both copper-bearing and non-copper-bearing exposed to the atmosphere at Annapolis, Md., for over 17 years have been observed. Similar tests in this series were completed at Pittsburgh, Pa., in 1923 and Fort Sheridan, Ill., in 1928. Complete records of the failures at these latter test sites appear in the *Proceedings*, Vols. 23 and 28, respectively.

Results have been reported of further inspections of the galvanized sheet specimens exposed at five test locations for over seven years. Tables of data have been prepared showing the progressive development of rust on the exposed sheet surfaces by coating classes at test locations at Altoona, Pa., Brunot Island, Pa., and Sandy Hook, N. J. An interesting summary has also been made of the failure at the Altoona test site where all galvanized sheet specimens have now rusted.

The exposure tests of plated coatings on steel, being carried on under the joint cooperation of the American Electroplaters' Society, the National Bureau of Standards and the A.S.T.M., are being continued and the data obtained from these tests are proving of considerable value in formulating suitable specifications covering plated coatings. A new series of outdoor exposure tests, involving particularly the exposure of plated coatings on non-ferrous metals, are being planned as a further cooperative effort. The planning of these tests has been largely completed and it is expected that the new samples will be exposed some time during 1935.

In a related cooperative activity with the American Electroplaters' Society, proposed drafts of specifications for nickel plating and chromium plating on steel and for zinc plating and cadmium plating on steel have been drawn up by a joint specifications committee. Comments on these suggested specifications have been solicited from interested producers and consumers.

Plans for a systematic study of atmospheric corrosion of galvanized wire and wire products have now taken concrete form with the completion by a special committee of the plans for the test program, the details of which were outlined in the December BULLETIN and completely described in the annual report of Committee A-5. Farm-field fencing, plain wire, barbed wire, wire strand and chain-link fence are to be exposed at some nine test sites in widely scattered locations representing different types of atmospheric conditions.

Committee A-10 on Iron-Chromium, Iron-Chromium-Nickel and Related Alloys, through its subcommittee on methods of corrosion testing, is experimenting with improvements in the salt spray test, the boiling nitric acid test and the copper sulfate stain test, following the extensive laboratory studies with these methods on four corrosion-resistant alloys reported last year. Consideration is being given to an electrode potential test, half-tide sea-water immersion tests of refinished salt spray specimens and to further study of the copper sulfate test with respect to effect of surface finish on reproducibility of results. Ability to detect adverse heat treatment of corrosion-resisting steels by this test and the effect of variation of solution concentration upon the results are also to be studied. The salt spray and the boiling nitric acid test are to be further examined in an attempt to improve



reproducibility of the former and decrease the time required for the latter.

Committee B-3 on Corrosion of Non-Ferrous Metals and Alloys has again presented a valuable progress report. Tests against sodium hydroxide were started in January, 1934, and the tests against sodium chloride in May, 1934. Weight loss data on 315 specimens exposed to sulfuric acid and tension tests on 162 corroded specimens also exposed to sulfuric acid were reported in 1934.

The subcommittee on galvanic and electrolytic corrosion reported the result of its examination of electrolytic couples after having been exposed for a one-year period to the outdoor atmospheres of nine different test locations. The results indicate that there is a change in corrosion behavior in the case of some metals when in contact with other metals. The changes are due to galvanic action complicated by other reactions resulting from the presence of soluble and insoluble corrosion products, differential aeration, concentration cells and other factors. In some instances the disks had been spread apart by the corrosion products and the metal to metal contact had apparently been broken. That galvanic action alone was not responsible for all of the corrosion that occurred is evidenced by the fact that in some instances both metals in the couple showed increased corrosion.

Outdoor atmospheric specimens which have been exposed three years at nine different test locations were inspected this fall at the National Bureau of Standards. The result of this inspection will be forthcoming in the 1935 annual report.

The Symposium on Outdoor Weathering of Metals and Metallic Coatings, held at the March, 1934, Regional Meeting in Washington, D. C., contains a thorough analysis of the performance data which have been obtained from the extensive Committees A-5 and B-3 atmospheric corrosion tests on ferrous and non-ferrous metals. Examples are given of proper uses to which the data may be put in the solution of similar corrosion problems. The reports of the committees, together with the symposium, illustrate the type of data which is being obtained and the conclusions which may be drawn from the tests to date. Copies of the symposium complete with the interesting discussion contributed at the meeting are available in a separate booklet and reprints of the committee reports have been issued.

Non-Ferrous Metals and Alloys

Committee B-2 on Non-Ferrous Metals and Alloys completed an important revision of the specifications for lead, which cover three grades of pig lead made from ore or other materials by processes of reduction and refining, and not reclaimed lead. Consideration is being given to a revision of the standard specifications for white metal bearing alloys, known commercially as "Babbitt metal."

In response to a demand for specification requirements covering lead-coated copper sheets for architectural uses, Committee B-2 has completed the proposed draft of a specification, which is published as information elsewhere in this BULLETIN for the purpose of soliciting criticisms and suggestions for their further improvements before recommending them to the Society for publication as tentative.

Copper Alloys

An important contribution by Committee B-5 on Copper and Copper Alloys, Cast and Wrought, was the promulgation of three specifications for copper-silicon alloys which cover, respectively, sheets and plates suitable for pressure vessel construction; rods, bars and shapes; and general specifications for sheet and strip suitable for drawing, forming,

stamping and bending. These specifications resulted from studies of copper alloys looking toward the replacement of tin—a "strategic metal." In preparing these specifications, the committee had to take into consideration the several alloys of this type available and the fact that certain of these involved patented or proprietary compositions. The prescribed limits of chemical composition are accordingly set so as to cover all such alloys now marketed or likely to be made available. In addition to chemistry, the alloys must meet individual requirements as to physical properties.

Revisions, chiefly affecting the composition limits and physical properties of several brass and bronze casting alloys, were also issued as tentative. The proposed improvements in these compositions are part of a program for modernizing the entire list of copper-base casting alloy specifications under the jurisdiction of Committee B-5. At the present time, attention is being given to the question of service of copper alloys at elevated temperatures.

The committee also has under consideration specifications for hard-drawn copper-silicon alloy wire, wrought metal bridge plates, and sheet copper for roofing.

The standard specifications for copper water tube and for free-cutting brass rod for use in screw machines, also under the jurisdiction of Committee B-5, have recently been approved as American Standards by the American Standards Association.

Electrical-Resistance Alloys

Committee B-4 on Electrical-Heating, Electrical-Resistance and Electric-Furnace Alloys completed a method for the linear expansion of metals, which was issued as tentative. By this test, which employs a quartz tube dilatometer in an electric tube furnace, the expansion of oxidation-resistant alloys at temperatures up to 1000 C. is determined. Analytical procedures for the determination of aluminum and titanium in nickel-chromium alloys were important additions to the methods of chemical analysis of metals for electrical heating.

Committee B-4 has been cooperating with the Joint Research Committee on Effect of Temperature on the Properties of Metals in improving the short-time and long-time high-temperature tension test methods, issued last year. A new tension test specimen for use at temperatures up to 1000 C. has been developed and high-temperature tests are now being made. A pattern and recommended practice to secure sound castings for test specimens have been prepared. A bend test is also being studied as a means of indicating the load-carrying capacity and the deformation of structural material at high temperatures. In order to determine the relative tendency of alloys to warp, a warpage test specimen is under consideration.

Testing procedures for determining the various properties of thermostatic metals are in course of development, and attention is being given to deflection under load and temperature. A new pendulum type testing machine for determining the temper of wires is being studied with a view to standardization of this method of testing.

The question of making the accelerated life test for heater wire at higher temperatures than those now specified is under consideration especially for materials having long life, in order to expedite the test. Comparative tests are being made at different temperatures.

Die Castings

Noteworthy among the recent developments in the production and use of die castings has been the preparation by Com-



ERRATA

TENTATIVE METHODS OF PHYSICAL TEST FOR LIMESTONE, QUICKLIME AND HYDRATED LIME (C 110 - 34 T)

Attention is called to the following important correction:

Proceedings, Vol. 34, Part I, p. 759 (1934); also 1934 Book of A.S.T.M.
Tentative Standards, p. 315.

Change the formula for calculating the plasticity of lime putty which appears in Section 9 of the above methods by placing a square root sign over the expression on the right-hand side of the equality sign. The formula should read as follows:

$$P = \sqrt{F^2 + (10T)^2}$$

American Society for Testing Materials

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mittee B-6 on Die-Cast Metals and Alloys of tentative specifications for magnesium-base alloy die castings, made possible by the commercial availability of magnesium alloys. The committee completed during the year a photographic inspection of the zinc die-cast specimens that have been exposed on the outdoor test racks for over four years at six locations throughout the country. Plans have also been formulated for the physical testing of the five-year exposed specimens brought in from the test sites and distributed to the cooperating laboratories.

Specifications are in preparation covering the low-melting point lead and tin-base die-casting alloys, and developments in the production of brass die castings are being followed closely by the committee. Fatigue studies of die-casting alloys are also under way using a rotating-beam fatigue test specimen.

Studies by E. A. Anderson and G. L. Werley of "The Effect of Variations in Aluminum Content on the Strength and Permanence of the A.S.T.M. No. XXIII Zinc Die-Casting Alloy," described in a paper appended to the annual report of Committee B-6, may result in certain desirable changes in the existing specifications. These authors have also presented interesting data on "The Impact Strength of Commercial Zinc Alloy Die Castings."

Light Metals

Committee B-7 on Light Metals and Alloys, Cast and Wrought, completed during the year a comprehensive compilation of authoritative information and data on the "Service Characteristics of the Light Metals and Their Alloys," which has been made available in a separate reprint pamphlet. The wealth of information on the metallurgical characteristics, physical and mechanical properties and methods of surface protection of aluminum and magnesium alloys is considered of great value to the engineering profession in the use of these metals.

A new specification for magnesium-base alloy ingot, covering eleven alloy compositions suitable for the manufacture of die castings, sand castings, sheet, forgings and other products, was prepared by Committee B-7 and the committee also made a number of improvements in the existing tentative specifications for aluminum sheet and plate and magnesium-alloy castings, sheets, plates and forgings. The committee is now considering the advisability of preparing specifications for aluminum alloys in ingot form covering those compositions used in die castings.

Fatigue of Metals

The Research Committee on Fatigue of Metals has continued its preparation of abstracts of articles on fatigue of metals in cooperation with *Metals and Alloys*. Cooperative relations have also been established with Committee E-4 on Metallography to study relations between metallographic and X-ray structures on the one hand and fatigue specimens on the other. The committee has given consideration to the method of studying fatigue phenomena by the use of the "probable damage line" for metals under repeated stress—the method devised by H. J. French—and work on this subject by various laboratories has been planned. The committee is now considering a preliminary outline of a recommended practice for making rotating-beam fatigue tests of metallic materials.

An interesting apparatus and test method, relatively inexpensive and much shorter than present procedures for determining the fatigue of metals, developed by G. N. Krouse, was

described in a paper entitled "A High-Speed Fatigue Testing Machine and Some Tests of Speed Effect on Endurance Limit."

Metallography

Committee E-4 on Metallography has made excellent progress in the completion of a combined group of procedures for the metallographic testing of both ferrous and non-ferrous metals, which will eventually replace the present standard methods. Of interest in connection with the work of this committee was a paper by J. R. Vilella on "The Polishing and Etching of Iron-Chromium-Nickel Alloys," which appeared as an appendix to the report of Committee A-10.

The committee has under consideration an important program dealing with X-ray and gamma-ray radiographic testing and X-ray diffraction looking toward the possibility of holding a symposium on this important subject.

Effect of Temperature

The Joint A.S.M.E.-A.S.T.M. Research Committee on Effect of Temperature on the Properties of Metals has continued its program of determination and correlation of fundamental properties of metals at high and low temperatures. A number of important improvements were made in the tentative short-time and long-time high-temperature tension test methods.

An investigation sponsored by the Joint Committee was reported by H. C. Cross in the July *Transactions* of the American Society of Mechanical Engineers on studies of cast and wrought 18-8 type chromium-nickel steels of 0.07 and 0.125 per cent carbon. The report contains the results of repeated stress (fatigue) tests and creep tests within the temperature range 1000 to 1200 F.; impact tests at room temperatures, both before and after the several steels had been subjected to sustained stresses at elevated temperatures; metallographic studies of carbide precipitation; magnetic analysis and some corrosion test data.

The Joint Committee is now giving consideration to a study of the relationship that may exist between a creep test when made over a period of several months and when made over a period of several years. The committee has also undertaken work for determining the relationship of stress to embrittlement of austenitic steels at elevated temperatures.

Cement

The annual report of Committee C-1 on Cement contains the detailed results of a thorough study of the data accumulated in the 1933 series of compression tests of 2-in. cubes of plastic mortars. Ten laboratories cooperated in the series, using 12 commercial cements. Two of the laboratories made concrete specimens. The study is of particular interest at this time, since some of the current specifications for large quantities of cement include compressive strength requirements. Based on the results of the investigation, the committee submitted a proposed method of test for compressive strength of portland cement mortars, which has now been issued as tentative.

The cooperative investigation of methods of chemical analysis of portland cement, undertaken by 10 laboratories, was completed. Supported by the data thus secured, Committee C-1 recently submitted to Committee E-10 on Standards revised methods of chemical analysis of portland cement which were accepted as tentative as mentioned elsewhere in this BULLETIN. These methods are offered at a very appropriate time because of the growing interest in the compound compositions as calculated from the analyses.



The second series of sub-sieve particle size comparative tests was also completed during the year. The results secured by the 25 cooperating laboratories, forming a very interesting part of the annual report of Committee C-1, should be of value to all producers of materials composed of finely divided particles. The report compares both size gradation and specific surface values obtained by four different methods. The Cement Reference Laboratory, a cooperative project of the National Bureau of Standards and the Society, and financially subsidized by Committee C-1, arranged a comparative test, by 30 laboratories, of a proposed method of calibrating the Wagner fineness turbidimeter by means of a standard fineness sample. The results of that investigation were favorable to the suggested method which was incorporated in a very timely proposed tentative method for turbidimeter fineness test of portland cement which has recently been accepted as tentative by Committee E-10 on Standards.

Work was continued on studies of volume change and soundness of portland cement and a progress report on the subject, included in the annual report of Committee C-1, presents data on volume change of neat cement bars subjected to various temperature and storage conditions. Sixteen commercial cements were used in the tests and further studies are contemplated.

A suggested specification for sulfate-resistant portland cement is under consideration. The specifications for high-early-strength cements are being actively studied and further test data are being secured. Information was also collected on the subjects of low-heat cements, blended cements and time of setting.

The Cement Reference Laboratory continued its field inspections, performing about two-thirds of the fourth tour among interested cement laboratories throughout the country. A comparison of the tests of apparatus examined in the first three tours (see annual report of Committee C-1), afforded proof of the steady improvement in the condition of such apparatus during the progress of the work.

Concrete and Concrete Aggregates

Committee C-9 on Concrete and Concrete Aggregates approved the adoption as standard of five specifications for curing concrete, and also developed new tentative specifications for sodium silicate in recognition of the need for a purchase specification for this material which is being used as a curing agent for concrete.

It is expected that the committee will complete during the year a new test for soundness of aggregates using magnesium sulfate, specifications for light-weight aggregates, a method for determining voids in coarse aggregates, and a comparison of the uniformity of three types of mortar compression specimens, cubes, cylinders, and prisms.

The subcommittees are actively at work on a number of projects, some of which may be completed this year. These include a specification for waterproof paper for curing concrete; a method for determining the constituents of fresh concrete; papers or reports on a recommended procedure for design of concrete on basis of strength and workability, on test specimens for concrete containing large size aggregate, on effect of crystal formations on disintegrations of aggregate, on numbers of specimens or samples required for reasonable accuracy in tests of aggregates, on a suggested method for measuring volume changes in concrete, on effect of segregation and water gain on durability of concrete, and on effect of sea water on durability.

An extensive investigation of the uniformity of compressive strength tests of 2-in. mortar cubes, in which a number of laboratories will cooperate, is being arranged by the new subcommittee on evaluation of data.

Brick and Refractories

The subcommittees of Committee C-3 on Brick are considering revisions of the specifications under their jurisdiction with the intention of eliminating conflicting requirements that may now exist, and to include requirements that will make them conform to the latest information obtained from recent investigative studies. In particular the methods of physical tests for brick and the specifications and tests for sewer brick are under consideration.

Committee C-8 on Refractories is actively engaged in establishing a suitable method of testing the thermal conductivity of refractory insulators and insulating refractories. Five laboratories are cooperating with the committee to develop a standard method of high accuracy and sufficient precision that the several laboratories may duplicate the results of one another.

The committee prepared the following new specifications and tests, which were issued as tentative by the Society: specifications for clay fire brick for incinerators; specifications for ground fire clay; new chemical procedures for analysis of magnesite refractories, a method of test for permanent linear change after reheating of refractory brick; and a load test and heating schedule to govern high-heat or super-duty refractories to be added to the present standard load test.

Revisions, extensive in some cases, were made in the following specifications and methods, and the committee approved them as tentative to replace those already in existence: specifications for clay fire brick for malleable furnaces with removable bungs and for annealing ovens; specifications for fire brick for stationary boiler service; two panel test methods for resistance of refractory brick to thermal and structural spalling; and the method for particle size of ground refractory materials. The panel spalling test methods represent quite an innovation in the testing of refractories.

Definitions have been adopted for silica fire clay, high-temperature bonding mortar and ground fire clay. Definitions are being prepared for insulating refractories, refractory insulation, calcination, and firing or burning as applied specially to hard-burn, soft-burn, etc., fire brick.

A great deal of attention has been given to the preparation of a completely revised and enlarged volume of "A.S.T.M. Standards on Refractory Materials," which has just become available. The new edition, in addition to including all the specifications, physical and chemical methods of testing and definitions of refractories, includes a revised manual of refractory test data, and for the first time, the analysis of eight standard samples of type refractory materials, and industrial surveys of service conditions in the following industries: open-hearth practice, malleable iron, copper, lead, and by-product coke ovens.

Masonry Building Units

Committee C-10 on Hollow Masonry Building Units added to its specifications for load-bearing concrete masonry units requirements intended to govern the percentage of moisture in such materials at the time of delivery. Minor improvements were made in three specifications for structural clay tile, covering respectively, wall tile, non-load-bearing tile and floor tile. An important revision in compressive strength of the 16-25 class of load-bearing side construction wall tile increased the required average value of five tests from 500



to 700 lb. per sq. in. and the individual minimum value from 350 to 500 lb. per sq. in. These three specifications superseded the existing standard specifications, which were accordingly withdrawn. The complete testing procedures for structural clay tile were brought up to date and issued separately as tentative.

The committee also has under consideration some further revision of the three tentative specifications, the most important being requirements for smooth tile and methods for calculating weights.

Timber

Committee D-7 on Timber revised its specifications for timber piling and expects during the coming year to present further improvements with a recommendation for adoption as standard at the next annual meeting. A number of changes have been developed in connection with the specifications for creosote and creosote coal-tar solution, issued as tentative last year, and which are the result of cooperative work between the American Railway Engineering Association, the American Wood Preservers' Association and the A.S.T.M. The specifications of the three national bodies are now in practical agreement.

An interesting paper on the subject "Measuring the Combustibility of Fire-Retardant Wood" was presented at the annual meeting by Messrs. Hartman, Williams and Bastress.

Paint and Allied Materials

Committee D-1 on Preservative Coatings for Structural Materials again contributed a number of important additions to its extensive list of standards. New specifications were issued for several varieties of titanium pigments, an improved high-strength lithopone and a pure zinc sulfide pigment which have attained an importance meriting the adoption of quality standards.

The committee completed the preparation of a method of test for mass color and tinting strength of dry color pigments or pastes and made a number of important changes in the existing tinting strength method for white pigments. The lively interest in this subject prompted the committee to sponsor a public discussion on the tinting strength of white pigments and dry colors which was opened by three papers, one, "A Discussion of the Accuracy and Utility of Methods of Test for Mass Tone and Tinting Strength of Dry Colors" by J. W. Ayers, and two papers on "Tinting Strength of White Pigments," one by R. H. Sawyer and the other by G. F. A. Stutz.

Important revisions were made in the specifications for white lead and for petroleum spirits. Specifications for turpentine and shellac varnish were adopted as standard.

Work on tung oil is contemplated by the committee with the object of modifying the present specifications in certain respects. In addition, oiticica oil is under consideration, with the view to preparing tentative specifications for this new product. A preliminary report is being prepared covering the subject of accelerated tests on varnishes. The matter of drawing up specifications to cover the selection of proper woods for exposure test is also under way.

An extensive cooperative program on hiding power has been undertaken by a number of paint laboratories and it is expected that this work will be complete in time for reporting this year.

Among the more important subjects being discussed by the committee, some of which are definitely under way, are the following: specifications for paints for underground pipe protection, accelerated tests for protective coatings, methods of

physical tests for varnish, study of the Kauri butanol and aniline test methods for solvency of mineral thinners, rust neutralizers to obviate complete cleaning of steel surfaces before painting, and tests for paints to obtain information respecting behavior under different environments.

Petroleum Products and Lubricants

An outstanding contribution by Committee D-2 on Petroleum Products and Lubricants was the development of the tentative specifications covering six grades of fuel oil for various types of oil-burning equipment. This is the first purchase specification issued by the committee and represents a significant trend in its work. In an attempt to supply the long-felt need for some classification differentiating types of fuel oils suitable for Diesel-type engines, the committee published as information with its annual report a proposed Diesel fuel oil classification.

The second edition, revised and enlarged, of the report on "Significance of Tests of Petroleum Products" was completed during the year by a special committee and has been issued by the Society in a separate reprint pamphlet.

The standard abridged volume correction tables for petroleum oils were revised and enlarged by the addition of tabulations covering two new groups, one for light and the other for heavy petroleum products. The various research projects now under way in the committee were summarized in the List of A.S.T.M. Research Activities, issued as a supplement to the October, 1934, BULLETIN. The various committee activities which were considered at a recent meeting of the committee are discussed in another article, appearing elsewhere in this BULLETIN.

Committee D-2, through its Technical Committee on Gasoline, has been studying the subject of vapor lock. In view of certain recommendations under consideration in the technical committee as to specification limits and method of determining vapor lock, a general discussion of this important subject was believed desirable, resulting in the presentation of two papers at the annual meeting: "Motor Fuels and Vapor Lock" by George Granger Brown, and "Motors and Fuel Vapor Pressure" by T. A. Boyd.

Road Materials

Committee D-4 on Road and Paving Materials presented five new specifications covering important types of asphalt emulsions. These resulted from a demand for purchase requirements for these materials due to the general development and use of bituminous paving emulsions in road construction. The committee also formulated a complete set of testing procedures for these emulsions designed to differentiate between the suitable and unsuitable products.

The committee reported the results of further cooperative tests in the series started in 1926 to perfect a method for the separation of the base and flux of asphaltic cut-back products. The work has culminated in the issue as tentative of a procedure for the separation of liquid asphaltic road materials.

The committee has added to its program a most important activity—a study of soils for highway construction. A new subcommittee has been organized to direct this work which is expected to result in the standardization of testing apparatus and technique for the examination and evaluation of soils.

The extensive research and investigative studies of subgrade soils carried out at the U. S. Bureau of Public Roads have yielded a wealth of knowledge on the physics of subgrade soils and their influence on highway construction. These



studies, which will serve as a basis for the work of Committee D-4, were discussed in a paper by C. A. Hogentogler and E. A. Willis on "Subgrade Soil Testing Methods."

Waterproofing and Roofing Materials

Committee D-8 on Bituminous Waterproofing and Roofing Materials completed during the year extensive revisions of four specifications covering various types of asphalt roofing and shingles and formulated methods of testing emulsified asphalts used for waterproofing. The methods of analyzing roofing felt for fiber composition were adopted as standard.

The committee included in its report, for general information, data obtained from reliable sources on the coefficient of expansion of various bituminous materials.

The committee has just authorized the organization of two new subcommittees, the first to undertake the development of tests for mineral surfacing materials, and the second to consider specifications for bituminous coatings for cold application which will include the type of waterproofing products known as "plastic bond." Consideration is being given to the standardization of an accelerated weathering test for waterproofing materials and the development of a tile test for determining the adhesion of bituminous emulsions.

Coal and Coke

Committee D-5 on Coal and Coke recommended for adoption as standard, with some changes, the tentative revision of the standard test for size of anthracite. A new method of test for agglutinating value of coal was published for information pending the standardization of a satisfactory inert material for mixing with the coal in this method of test.

The subcommittee on methods of testing conducted experiments on an accelerated method of test for measuring the slacking or weathering properties of coal. The coal is alternately dried and wetted and the amount of disintegration measured by means of a sieve test. To control the drying process an experimental oven was built for drying the coal in circulating air at a constant humidity and temperature. The subcommittee on coal friability made satisfactory progress in standardizing a method of test to measure the resistance of coal to breakage on handling. This work indicates that the standard coke shatter test with minor modifications is applicable for testing coal friability.

The subcommittee on pulverizing characteristics of coal has been very active in testing different laboratory methods for measuring coal grindability. Five laboratories have made grindability tests by four methods of five standard coals covering a wide range of grindability characteristics. These cooperative tests should be of value in selecting the method best adapted for testing coal grindability.

The Sectional Committee on Classification of Coals, functioning under procedure of the A.S.A., developed tentative specifications for the classification of coals according to rank and grade. The classification of coals according to rank is based on the composition and properties of coal with emphasis on the properties which vary in the progressive alteration of coal in the natural series from lignite to anthracite. The basic scheme of classification by rank is according to fixed carbon and calorific value (expressed in B.t.u.) calculated to the mineral-matter-free basis. The higher rank coals are classified according to fixed carbon on the dry basis; and the lower rank coals according to B.t.u. on the moist basis. Agglutinating and slacking indices are used to differentiate between certain adjacent groups. The classification of coals according to grade depends primarily upon the amount and

nature of the impurities; the grade of a coal being determined by the calorific value, ash, sulfur, and ash-softening temperatures of the coal as sold.

The subcommittee on boundary lines is giving further consideration to the boundary line between low and medium volatile coal, and to the desirability of dividing the low volatile and medium volatile bituminous coal groups into three groups so as to obtain a closer grouping of coals of similar properties.

The technical committee on coal classification, through its subcommittees, is preparing a chart showing the relative importance of various chemical and physical properties of coal in the use of these coals for various purposes, such as production of steam, producer gas, manufactured gas, coke, etc.

Progress is being made in the formulation of a method of test for the screen analysis of bituminous coal for use in defining sizes of coal. The method includes sampling procedures, screen specifications, and the method of making the screen test. Work is also being continued on formulating specifications for the classification of coal according to type.

Electrical Insulating Materials

Committee D-9 on Electrical Insulating Materials completed specifications for molding powders for the manufacture of molded electrical insulators, adopted important changes in the methods of testing electrical porcelain, issued a tentative revision of the tests for molded insulating materials and made changes and additions in a large number of the existing methods of testing.

Since Committee D-9 deals with a wide variety of insulating materials, it is necessary to carry on an extensive study and test program. A summary of a number of the investigative and research studies now under way appeared in the October, 1934, BULLETIN.

Other subjects being considered by the committee include cable oils, life tests for oils in the presence of a catalyst, arc-resistance tests, dielectric tests, including effect of rate of voltage rise, power-factor measurements, including bridge circuits, electrodes and test cells, and mica classification and grading.

Methods of test for shellac suitable for electrical insulation uses have been proposed and are being submitted to letter ballot. Improvements in viscosimeters are being studied and the possibility of securing a simple control-type unit seems hopeful.

The committee hopes to have a single standard procedure for determining the thickness of all the insulating materials.

The importance of the effects of humidity conditions on test results on sheet and molded insulation and tapes has prompted the formation of a subcommittee to study this subject. Varnished cloth tape, for which there is a tentative specification, is receiving study, especially from the standpoint of the requirements for cable splices and other hand-wrapping operations. A machine is being used to measure the pull when applying the tape.

Rubber Products

Committee D-11 on Rubber Products has, during the past year, actively carried forward its program of development of test methods for rubber products. To this end methods have been prepared and published as tentative for the measurement of abrasion resistance and the determination of compression set. In the case of abrasion resistance a number of widely used test machines are available commercially, each of which finds valuable use under certain conditions. It has, therefore,



not been possible for the committee to adopt a single standard method and, instead, standard procedures were prepared for the six types of equipment in most common use. The test for compression set is used particularly in evaluating rubber compounds designed for purposes of vibration absorption, and the adoption of a standard method for this test is especially valuable.

Extensive revisions were made in the specifications for friction tape and rubber insulating tape and also in the specifications for insulated wire and cable. In the latter, an especially valuable contribution has been made through the preparation of new tables of insulation thickness and test voltages. A proposed specification for linemen's rubber blankets was prepared and published for information and criticism.

A number of other projects are actively going forward in the committee. Specifications are being prepared for braided saturants and finishes for insulated wire and for 60 per cent rubber sheaths. Tests are being studied for use with wires and cables having composite or non-homogeneous sheaths. Standard test procedures are being prepared for accelerated aging tests both in the Geer oven and the oxygen bomb. Standard procedures are also being prepared for flexing test methods. Both of these methods are especially needed since the tests which they cover may be classed as performance tests and are continually acquiring increasing importance in the evaluation of quality of rubber products. A proposed method for measuring the adhesion of rubber to metal is being considered as a basis for a standard procedure. Investigation is being continued of methods of testing rubber in compression.

Active work is in progress on the study of resistance of rubber to action of oil, and methods of measuring this. An extensive survey covering 159 laboratories showed very little standardization in this field. A definite program looking toward standardization has been prepared and cooperative tests designed to determine the fundamental principles involved are being carried out. Two general methods of making available reference standards are under consideration. One would involve the distribution of standardized lots of compounding materials. The other contemplates making available for purchase, test specimens of standard vulcanized rubber compounds having known physical properties. If such an arrangement can be developed, it should operate in a manner analogous to the system at present in use whereby the National Bureau of Standards supplies analyzed chemicals, metals, and the like.

Textile Materials

Committee D-13 on Textile Materials adopted as standard the shrinkage test for woven cotton fabrics and adopted changes in the specifications for chafar tire fabrics, for holland cloth, hose and belt ducks, and general methods of testing. The standard specifications and test methods for cotton goods for rubber and pyroxylin coating, the specifications for 0.007-in. cotton tape and the method of determining relative humidity were adopted as standard.

The Subcommittee on Cotton has been especially active and has completed the following test methods for cotton fibers: length and length distribution, fineness, immaturity count and procedures for the strength of raw cotton. The newly organized Subcommittee on Silk has submitted a proposed method for the determination of shrinkage in silk and rayon broad goods. The proposed test for elongation of woven textile materials has been revised and changes have

been proposed in the standard specifications for tension and elongation testing machines, and a new definition of "direction of twist."

Water for Industrial Uses

Committee D-19 on Water for Industrial Uses is still perfecting its program of work before proceeding with the formulation of standard nomenclature and methods of sampling and analysis, classification and specifications.

The committee is developing a discussion on the manner of expressing dissolved salts, dissolved oxygen and carbon dioxide and hydrogen ion concentration where these determinations are used and applied.

There has been made available for study, by the Subcommittee on Methods of Sampling, reports of procedures used in locomotive boilers, in marine work, in the paper industry and in domestic supply. It will be recognized that the question of sampling is extremely broad and because of the different industries involved and the purpose for which samples are required, the progress of work necessarily is slow.

The determinations of calcium, magnesium and chloride ions have been reported. Methods of analysis of phosphate, carbonate, hydroxide, sulfate and dissolved oxygen are under consideration and may possibly be available for publication as information.

Methods of Testing

Committee E-1 on Methods of Testing made important changes in its methods of verification of testing machines. Attention is being given to the use of the tension test for judging the suitability of sheet metals for various purposes. A discussion on the subject is appended to the annual committee report. The committee is now collecting data and information from various sources of the tests regularly applied to all types of sheet metals and the usefulness of these tests.

A new technical committee just appointed will give consideration to the methods of designating chemical, physical and other specification requirements in the standards of the Society, and particularly to the significance of the tolerances or permissible variations prescribed for these requirements.

That the subject of application of statistical methods to the interpretation and presentation of data is of considerable interest is evident from the fact that a number of the standing committees have appointed subcommittees on this subject. Examples of the practical application of such methods to specifying and controlling quality of materials were presented in the following two papers sponsored by Committee E-1 at the annual meeting: "Acceptance-Rejection Requirements in Specifications" by H. F. Dodge and "Application of Statistical Methods to the Solution of Metallurgical Problems in the Steel Plant" by W. C. Chancellor.

Necrology

We announce with regret the death of the following:

J. S. DOYLE, Assistant to General Manager, Interborough Rapid Transit Co., New York City. Member since 1910.

JOHN A. HENRY, Chief Inspector, Homestead Steel Works, Munhall, Pa. Member since 1911. Mr. Henry had been at the Homestead Company for 35 years.

DANA PIERCE, President, Underwriters' Laboratories, Chicago, Ill. Member since 1931.

A. J. ROGERS, Superintendent, The National Refining Co., Findlay, Ohio. Member since 1923.

J. B. SCHLOSSBERG, Plant Manager, The Highland Iron and Steel Co., Terre Haute, Ind. Member since 1919. Mr. Schlossberg was a member of Committee A-2 on Wrought Iron.

S. SVENNINGSEN, Chief Engineer, Shawinigan Engineering Co., Montreal, P. Q., Canada.

New Members to January 28, 1935

The following 49 members were elected from January 1 to January 28, 1935:

Company Members (10)

AREND PETROLEUM MAATSCHAPPIJ, G. Davidson, Manager, Oranjestad, Aruba, D. W. I.
CANNON MILLS CO., Z. B. Bradford, Assistant Superintendent, Kannapolis, N. C.
CARRIER ENGINEERING CORP., J. H. Holton, Assistant Chief Engineer, 850 Frelinghuysen Ave., Newark, N. J.
FISH-SCHURMAN CORP., Ferdinand Schurman, President, 230 E. Forty-fifth St., New York City.
HANLON-BUCHANAN, INC., R. E. Miller, Vice-President, Box 1559, Tulsa, Okla.
HUMBLE OIL AND REFINING CO., PETROLEUM ENGINEERING DEPT., W. T. Doherty, Assistant Chief Petroleum Engineer, Houston, Tex.
HYVIS OILS, INC., R. E. Dunham, Research Engineer, Warren, Pa.
MINNESOTA MINING AND MANUFACTURING CO., L. A. Hatch, Manager, Mineral Division, Wausau, Wis.
SHAWMUT ENGINEERING CO., E. F. Hathaway, Vice-President and General Manager, 179 Freeport St., Dorchester, Boston, Mass.
SOUTHERN PINE CHEMICAL CO., A. R. Hitch, Director of Research, Box 389, Jacksonville, Fla.

Individual and Other Members (30)

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NELSON, L. M., Commissioner, Water and Light Dept., Hastings, Nebr.
NIEMAN, H. W., Engineer, Bethlehem Steel Co., Inc., Bethlehem, Pa.
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PATRICK, J. H., Secretary, The Firth Carpet Co., Firthcliffe, N. Y.
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TOMPKINS, H. M., Analytical Laboratory Supervisor, National Carbon Co., Inc., Fostoria, Ohio.
VAUGHAN, N. E., Asphalt Engineer, Atlantic Union Oil Co., Ltd., Pitt St., Sydney, Australia.
WEINBERG, B. B., General Manager, Baldt Anchor, Chain and Forge Corp., Sixth and Butler Sts., Chester, Pa.
WRIGHT, E. C., Superintendent, Metallurgical Dept., National Tube Co., Ellwood City, Pa.

Personals

News items concerning the activities of our members will be welcomed for inclusion in this column. Such news items are of very great interest to the membership at large and the number should be considerably augmented

T. A. WRIGHT, Technical Director and Secretary, Lucius Pitkin, Inc., has been elected president of the Association of Consulting Chemists and Chemical Engineers.

The 1935 officers of the American Chemical Society include the following A.S.T.M. members: EDWARD BARTOW, Professor and Head, Department of Chemistry and Chemical Engineering, State University of Iowa, President-Elect for 1935; THOMAS MIDDLEY, JR., Vice-President, Ethyl Gasoline Corp., reelected Director-at-Large; A. C. FIELDNER, Chief Engineer, Experiment Stations Division, U. S. Bureau of Mines, a Councilor-at-Large of the A.C.S. Council.

BENJAMIN H. THURMAN, formerly Vice-President, Durkee Famous Foods, Inc., Elmhurst, Long Island, N. Y., is now Vice-President, Refining, Inc., Long Island City, N. Y.

W. H. FULWEILER, Chemical Engineer, United Gas Improvement Co., has been elected a Manager of the Franklin Institute and a member of The Board of Governors, Rittenhouse Astronomical Society.

FRED J. WALLS has recently become Metallurgist, Development and Research Dept., The International Nickel Co., Inc., New York City. He was formerly associated with the Wilson Foundry and Machine Co., Pontiac, Mich., as Chief Metallurgist.

M. Y. SEATON, formerly Vice-President, California Chemical Corp., Newark, Calif., recently became associated with United Chemicals, Inc., New York City.

ROBERT F. MEHL, Director, Metals Research Laboratory, Carnegie Institute of Technology, has been awarded the John Scott Medal by the Philadelphia Board of City Trusts "for his discovery of a method of taking pictures through great thicknesses of steel to determine internal defects."

A number of A.S.T.M. members have been nominated for Divisional Officers of the American Institute of Mining and Metallurgical Engineers for the coming year. E. H. DIX, JR., Chief Metallurgist, Aluminum Research Laboratories, Aluminum Co. of America and A. J. PHILLIPS, Superintendent of Research, American Smelting and Refining Co., were nominated Vice-Chairmen, and W. H. BASSETT, JR., Technical Superintendent and Metallurgist, Anaconda Wire and Cable Co., and O. W. ELLIS, Director of Metallurgical Research, Ontario Research Foundation, on the Executive Committee of the Institute of Metals Division. J. H. HALL, Technical Assistant to the President, Taylor-Wharton Iron and Steel Co., and J. T. MACKENZIE, Chief Chemist, American Cast Iron Pipe Co., have been nominated Vice-Chairmen, and E. C. BAIN, Metallurgist, United States Steel Research Laboratory; EARLE SMITH, Professor of Mechanical Engineering, College of the City of New York; and BRADLEY STOUGHTON, Director, Curriculum of Metallurgical Engineering, Lehigh University, for members of the Executive Committee, Iron and Steel Division.

Junior Members (9)

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